

Appln. No. 10/009,504

Attorney Docket No. 10541-824

II. Remarks

Claims 1-13 and 15-24 stand rejected. Claims 1 and 13 are being amended. Accordingly, after entering this amendment, claims 1-13 and 15-24 remain pending.

The independent claims (claims 1 and 13) are being amended to more clearly define Applicant's invention. Specifically, amended claims 1 and 13 are each directed to a heat exchanger with a tube having a flattened cross-section with two major opposing walls. The walls are provided with projections that divert some of the flow of coolant to enhance heat exchange from the fluid. After being diverted by a particular projection, the diverted flow of fluid resumes laminar flow before encountering subsequent projections.

The arrangement and size of the projections in the claimed invention ensures that incoming laminar flow is diverted about the projections to promote a substantially uniform temperature distribution throughout the tube to enhance the heat exchange performance of the tube. The size and arrangement of each projection also allows the flow to resume its laminar form before it encounters the next projection. Accordingly, although the flow is diverted around the projections, the flow remains generally laminar in form to reduce back pressure in the tube to minimize resistance in the flow.

Reconsideration and re-examination of this application in view of the above amendments and the following remarks are respectfully requested.

Claim Rejections – 35 U.S.C. § 102 and 103

Claims 1-5, 9, 12, 13, 15-17, 21, and 24 have been rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,730,213 to Kiser et al., or, in the

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alternative, under 35 U.S.C. § 103(a) as being obvious over Kiser. Claims 6-8, 10, 11, 18-20, 22, and 23 have been rejected as being unpatentable over the combined teachings of Kiser and U.S. Patent No. 4,470,452 to Rhodes.

Kiser discusses a flattened cooling tube for heat exchangers. The tube has internal opposing walls provided with inwardly projecting dimples. The size, shape and arrangement of the dimples causes the flow of coolant through the tube to become turbulent. Specifically, Kiser states that the purpose of the dimples is to enhance heat transfer from the coolant in the tube by causing "a turbulent fluid flow within the tube." (See, e.g., column 4, lines 57-58.) Once turbulent flow is created in Kiser's tubes, the flow remains turbulent. In particular, Kiser's dimples amplify the disturbances in the flow of coolant to ensure that the inertia forces in the flow are destabilizing. As such, the turbulent flow in Kiser's tube is self sustaining, since after the turbulent flow develops, it does not die out but rather perpetuates itself.

On the other hand, amended claims 1 and 13 require the flow of coolant to resume laminar flow after being diverted by each projection and before encountering subsequent projections. Thus, in Applicant's invention, the viscous forces in the flow of coolant restore laminar flow after the flow is diverted around the projections.

Thus, Kiser does not teach each and every limitation of amended claims 1 and 13. Accordingly, reconsideration and withdrawal of the rejections of claims 1 and 13 under 35 § 102(b) are respectfully requested.

Indeed, Kiser fails to appreciate the advantages of maintaining substantially laminar flow in the tube. Absent an appreciation of these advantages, there is no suggestion of a flattened heat exchanger tube with projections that extend into the cross-sectional area to divert some of the flow of coolant around the projections, such

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that the flow of coolant resumes laminar flow before encountering subsequent projections, as required by amended claims 1 and 13.

Thus, Kiser cannot render Applicant's invention, as claimed in claims 1 and 13, as obvious. Accordingly, reconsideration and withdrawal of the rejections of claims 1 and 13 under 35 § 103(a) are respectfully requested.

Since Rhodes does not cure the deficiencies of Kiser and claims 2-12 and 15-24 depend from either claims 1 or 13, directly or indirectly, the reasons for allowance of claims 1 and 13 apply as well to the dependent claims.

III. Conclusion

In view of the preceding amendments and remarks, it is respectfully requested that all of the pending claims (claims 1-13 and 15-24) are in condition for allowance. Such action is respectfully requested.

Respectfully submitted,

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